CURRENT RESEARCH AND DEVELOPMENT IN BIOTECHNOLOGY ENGINEERING AT IIUM

VOLUME II

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Department of Biotechnology Engineering
Faculty of Engineering
International Islamic University Malaysia

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IMPROVEMENT OF SONICATION PROCESSING CONDITIONS FOR EXTRACTION OF ANTIBACTERIAL COMPOUNDS FROM *Spathiphyllum cannifolium*

Raha Ahmad Raus, Nur Shazwana Mohd Puzi and Parveen Jamal

Department of Biotechnology Engineering, Faculty of Engineering,
International Islamic University Malaysia, P.O. Box 10, 50728 Kuala Lumpur, Malaysia

ABSTRACT

Application of sonication during extraction has been reported to increase component extraction yield and reduce solvent consumption. In this study optimization of sonication conditions to extract antibacterial compounds were carried out to obtain maximum yield of antibacterial compounds from *Spathiphyllum cannifolium*. *S. cannifolium* is a flowering plant which was previously shown to possess high anti-bacterial activity. Two parameters of sonication processing condition, namely the extraction time (minutes) and temperature (°C) were optimized in this study. Central Composite Design (CCD) was used to design the optimization experiments. A set of eleven experiments was designed and data obtained from those experiments were fitted to the mathematical model in which was used to plot tri-dimensional (3D) response surfaces graph. Unfortunately, a full elliptical response was not plotted on this graph thus optimum conditions for the extraction of antibacterial compounds were unable to be obtained. Further observation on the 2D plot however, suggested that optimized conditions might be obtained at the range of temperature between 55 to 60°C and the time between 15 to 20 minutes as it will yield maximum zone of inhibition or antibacterial compounds. The ANOVA analysis indicated that temperature had significant effect on maximizing the zone of inhibition. Both time and interaction between two independent variables (time and temperature) were not significant to the zone of inhibition.

Keywords: sonication, antibacterial activity, *Spathiphyllum cannifolium*, central composite design (CCD)

INTRODUCTION

Extraction methods used in pharmaceutical industry, involve ration of medicinally active portions of plant tissues from the inactive/inert components by using selective solvents with appropriate extraction technology. During extraction, solvents diffuse into the solid plant material and solubilize compounds with similar polarity (Green, 2004). There are many types of extraction methods that have been adopted in the industry and labs. Sonication is one of them and it involved the usage of high-intensity ultrasound (HI-US).